What is claimed is:

1. An apparatus for preventing an overshoot in a rotation speed of an internal-combustion engine, comprising:

a starter/battery charger that is coupled to a crank shaft of the internal-combustion engine, operates as a starter for starting the internal-combustion engine, and also operates as a battery charger for charging a battery after the internal combustion engine has been started; and

a controller for performing a driving control and a braking control on the starter/battery charger and thereby controlling the rotation speed of the internal-combustion engine,and then preventing the overshoot in the rotation speed of it,

wherein the controller is constructed so as to monitor the rotation speed of the internal-combustion engine, to carry out a judgement that a self-ignition state has been established in the internal-combustion engine depends on one of the rotation speed of the internal-combustion engine and a variation rate of the rotation speed has exceeded a prescribed value during an engine starting operation, and to switch from the driving control to the braking control upon the judgement that the self-ignition state has been established in the internal-combustion engine.

2. An apparatus for preventing an overshoot in a rotation speed of an internal-combustion engine, comprising:

a starter/battery charger that includes 3-phase armature

coils, is coupled to a crank shaft of the internal-combustion engine, operates as a starting motor for starting the internal-combustion engine, and also operates as a charging generator for charging a battery after the internal-combustion engine has been started; and

a controller for performing a driving control for causing the starter/battery charger to generate positive torque and a braking control for causing the starter/battery charger to generate negative torque and thereby controlling the rotation speed of the internal-combustion engine,

wherein the controller causes the starter/battery charger to generate negative torque in the braking control by effecting short-circuiting between phases of the 3-phase armature coils of the starter/battery charger, to thereby prevent the overshoot in the rotation speed of the internal-combustion engine.

3. The apparatus according to claim 2, further comprising switches that are provided between 3-phase lines of the 3-phase armature coils of the starter/battery charger, for effecting the short-circuiting between the phases of the 3-phase armature coils.

4. The apparatus according to claim 2 or 3, wherein the starter/battery charger further includes a field coil, and wherein the controller controls not only currents flowing through the 3-phase armature coils but also a current flowing through the field coil, to thereby prevent a rapid torque variation in

the starter/battery charger.

5. A method for preventing an overshoot in a rotation speed of an internal-combustion engine, the method using a starter/battery charger that is coupled to a crank shaft of the internal-combustion engine, operates as a starter for starting the internal-combustion engine, and also operates as a battery charger for charging a battery after the internal-combustion engine has been started, the method comprising the steps of:

carrying out a judgement that a self-ignition state has been established in the internal-combustion engine depends on one of a rotation speed of the internal-combustion engine and a variation rate of the rotation speed has exceeded a prescribed value during an engine starting operation; and

switching a control on the starter/battery charger from a driving control to a braking control upon the judgement that the self-ignition state has been established in the internal-combustion engine, to thereby prevent the overshoot in the rotation speed of the internal-combustion engine.

6. A method for preventing an overshoot in a rotation speed of an internal-combustion engine, the method using a starter/battery charger that includes 3-phase armature coils, is coupled to a crank shaft of the internal-combustion engine, operates as a starting motor for starting the internal-combustion engine, and also operates as a charging generator for charging a battery after the internal-combustion engine has been started;

and a controller for performing a driving control for causing the starter/battery charger to generate positive torque and a braking control for causing the starter/battery charger to generate negative torque and thereby controlling the rotation speed of the engine, wherein:

the starter/battery charger is caused to generate negative torque in the braking control by effecting short-circuiting between phases of the 3-phase armature coils of the starter/battery charger, to thereby prevent the overshoot in the rotation speed of the internal-combustion engine.

7. The method according to claim 6, wherein the short-circuiting between the phases of the 3-phase armature coils of the starter/battery charger is effected by using switches that are provided between 3-phase lines of the 3-phase armature coils.

8. The method according to claim 6 or 7, wherein the starter/battery charger is a rotary electric machine including a field coil in addition to the 3-phase armature coils, and wherein not only currents flowing through the 3-phase armature coils but also a current flowing through the field coil is controlled, to thereby prevent a rapid torque variation in the starter/battery charger.